

# The Impact of Unemployment on Health. Longitudinal Evidence from Italian Administrative Data.

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with

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*Globalization, Working Conditions and Health*

*Bordeaux  
25-27 June 2015*

# motivation

The **health side story** of labour market functioning is gaining more and more attention in the literature and among policy makers.

- Indeed, this is comprehensible from the POV of health policies (*“Health in All Policies” initiatives*)
- From the POV of labour market policies:
  - there’s a shift of attention from economic outcomes to the **well-being** of individuals, and health is a key component of it.
  - in C/B analyses, externalities from work to health (and the induced costs or savings) are increasingly taken into consideration.
  - healthy working conditions are a **job amenity** which is increasingly investigated besides the “usual” ones (wage & job security)

# motivation

In the case of **unemployment**, it is recognized that it can affect health through physiological, psychological and behavioral pathways.

While the extant **literature** consistently found a causal effect of unemployment on several health outcomes (e.g. on all-causes mortality, suicidal intentions, anxiety and depression), its relation with Coronary Heart Diseases (CHD) **is still controversial**.

Which is a huge knowledge gap: CHD is the leading cause of death in Europe among adults and it is the first cause for hospitalization in Italy, after childbirth.

# the causal chain from unemployment to CHD

What the literature mainly investigated is the effect of unemployment among those who were employed. Here the main channels are:

- Job loss itself, and then the permanence in unemployment may imply a shame, or stigma, which implies **psychological distress**.
- There is an income loss, which may **limit healthy lifestyles** and limit **access to health care** and services.
- There is also a loss of firm-specific human capital, which may limit the hopes of recovering past levels of income.
- Also other job-related **intangible assets** are lost, such as status, time structure, and social networks (Jahoda 1981, Fryer 1986, Warr 1987), which may lead again to psychological distress and to **unhealthy behaviours**.

# the causal chain from unemployment to CHD

We may expect **two gradients**, or dose-response patterns to emerge:

- The longer is the **unemployment duration**, the longer an individual is exposed to the risk factors outlined.
- The larger is the **loss in intangible assets**, the larger will be the psychological distress experienced.

Three factors, on the other hand, may **countervail** the effects:

- The **welfare** may limit the impact on income and health care access.
- The worker is no more exposed to **occupational risk factors**.
- Also **healthy behaviours** may be triggered by unemployment, since individuals have more time for leisure.

# it's hardtimes also for the literature!

The evidence we may find in the literature is still mixed, and many null results are reported. Besides the presence of the quoted countervailing factors, this is presumably due to two main issues.

The first is a **measurement** one: There is a sort-of trade off between the accuracy with which we measure unemployment and CHD outcomes.

- In **survey data**, unemployment is measured as it should be, according to the statistical definition. On the other side, self reported health status is of bad quality; data are often cross sectional, and, when longitudinal, the follow up is often short.
  - *while for mental disorders a short run effect of unemployment can be detected, the latency leading to CHD is long, and “short” data may miss it*

# it's hardtimes also for the literature!

- In **administrative data** we have accurate and long data on health, but the only labour market statuses clearly identifiable are whether an individual is working or not, and, when not employed, whether s/he is receiving an unemployment benefit.

**BUT**, depending on the institutional context, registered unemployed may not meet the statistical definition. Also individuals who are inactive are included, leading to a **dilution** of the effect.

**AND**, those who receive benefits are the luckiest among the unemployed, so that we are looking for an effect on individuals for whom it is probably lower.

# it's hardtimes also for the literature!

The second has to do with **endogeneity**: unemployment itself may be the result of bad health!

Up to the meta-analyses by Jin *et al* (1997) and Weber *et al* (1997), the main evidence was that of a strong positive association between unemployment and many health outcomes, among which CHD, but most studies did not adopt a proper design to address endogeneity.

Actually, in subsequent studies, the significant associations observed in crude analyses decreased and lost significance after controlling for health status before job loss (Yarnell et al., 2005; Lundin et al., 2010; Garcy & Vagero, 2012).

# it's hardtimes also for the literature!

A strand of the literature addressed reverse causality using as a natural experiment the exposure to plant closures, reporting many null results (Browning et al. 2006; Keefe et al 2002; Sullivan et al. 2009; Eliason and Storrie 2009a and 2009b). Positive effects was reported in (Browning et al. 2012).

Again, we may be looking at an effect where **the dose is smaller**: many workers may find a new job briefly after the plant closure. Moreover, the psychological harm of an individual layoff is higher to that experienced during a plant closure. On health outcomes other than CHD, this has been found by Martikainen et al. 2007, and Schmitz 2011.

# our research question & answers' preview

**Q** - Does unemployment increase the risk of Coronary Heart Disease of adult Italian blue-collar men?

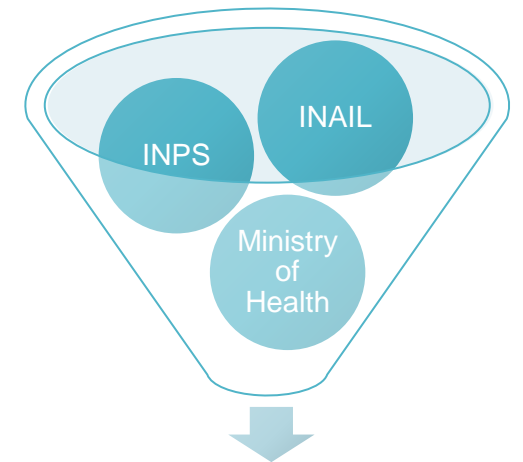
**A1** - We find robust evidence of a high and significant increased risk of CHD for workers who cumulated more than three years of unemployment.

**A2** - Among workers who exit unemployment starting a self-employment activity, we find evidence of increased risk also at shorter durations. Descriptives say that they could be those who cannot allow to remain unemployed.

**A3** - There is a clear pattern in all our analyses: the more healthy and attached to the labour market were the treated, the higher is the increase in the risk of CHD, pointing to a “disappointment effect” (Osika *et al*, 2008; Montgomery *et al*, 2013).

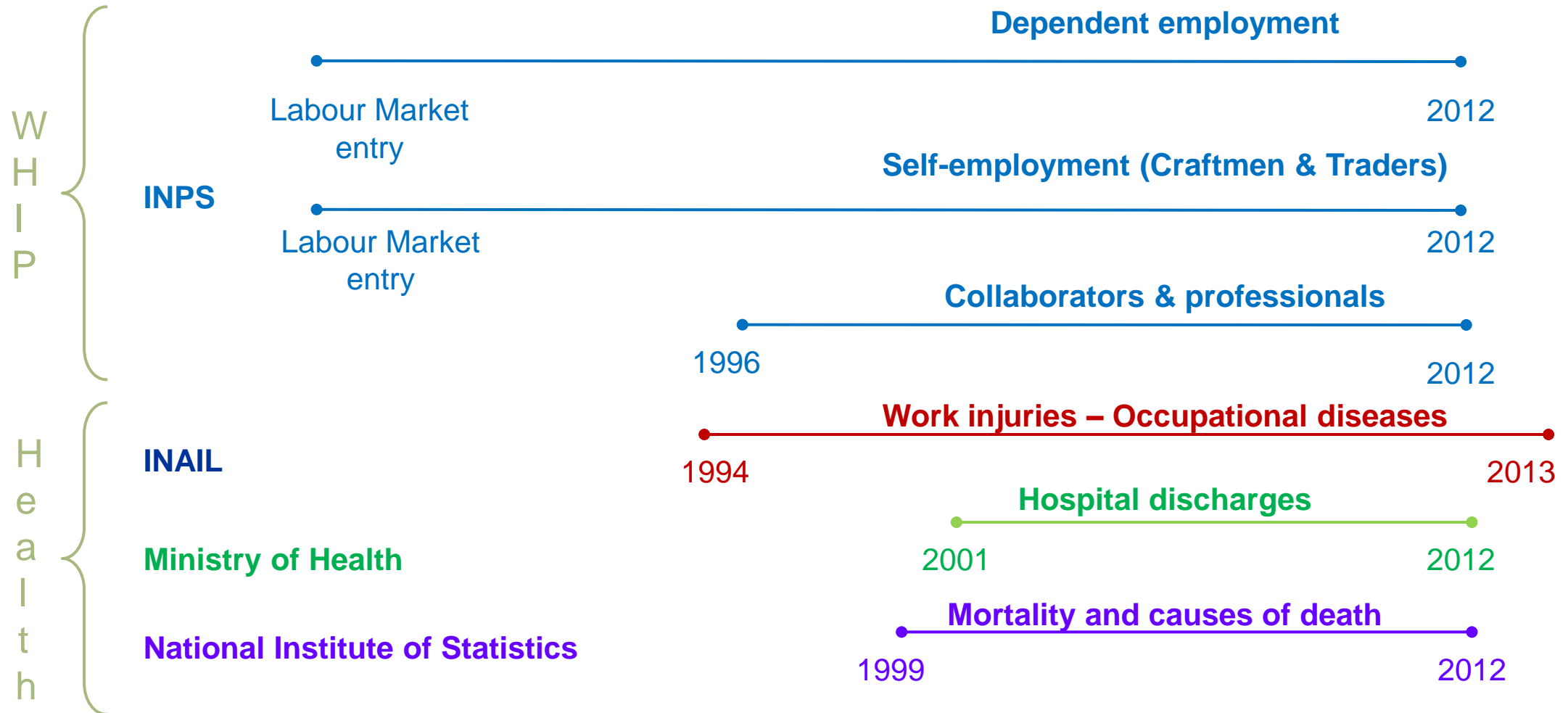
We used the **WHIP-Health** database, which is an integrated system of Italian administrative data:

- WHIP (*Work Histories Italian Panel*): 7% sample drawn from the National Social Security Administration (INPS) representative of non agricultural employment in the private sector
- Injury and professional diseases obtained from the Work Injuries Insurance Administration (INAIL)
- Hospital Dismissal Forms from the Ministry of Health



**WHIP-Health**

# WHIP-Health currently goes from labour market entry to 2013

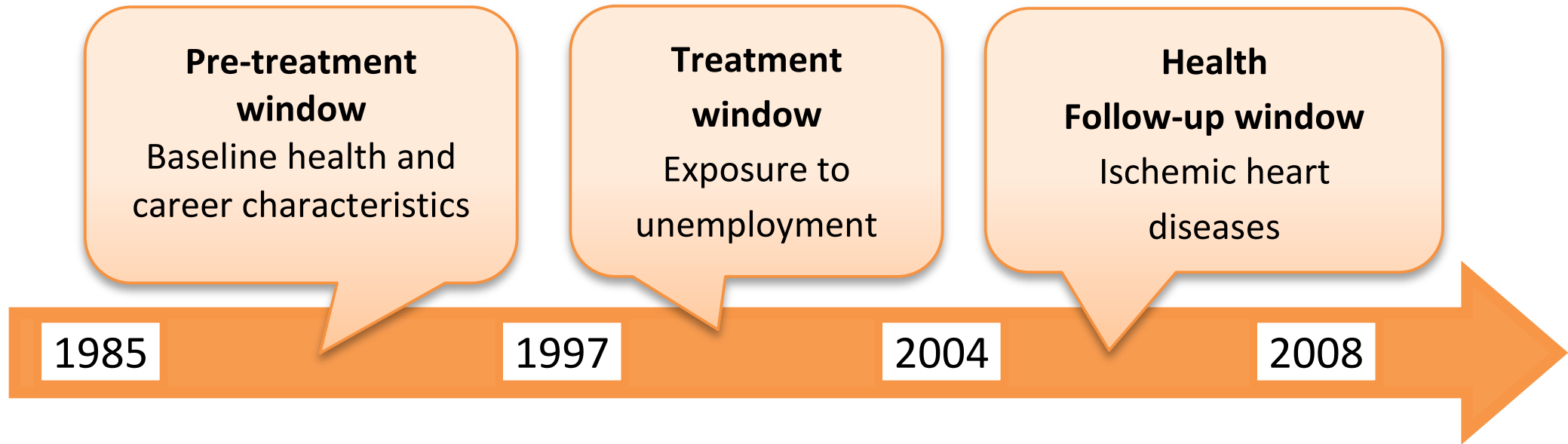


# unemployment definition

The main idea was to start large, cumulating all non-employment periods, and then to exclude the ones when the non-employment was probably due to inactivity or informal employment. The exclusion criteria:

- individuals with seasonal career patterns;
- individuals recalled by the same employer;
- individuals who directly transit from subsidized unemployment to pension benefits;
- individuals who, although eligible, never received an unemployment benefit.

# study design



We considered a very homogeneous population (male, mid-age, blue-collar, only and ever dependent workers, with a high labour market attachment at baseline), excluding the holders of invalidity or disability benefits and those who in the treatment window had a CHD.

# statistical model

We used Propensity Score Matching to balance the characteristics during the pre-treatment window; and a Poisson model as a robustness check.

**balancing variables:** career and health characteristics

age and age-square; area of birth; modal sector of activity, firm size and area of work; entry wage; average wage; weeks of unemployment; n. of unemployment subsidies; weeks in sick leave; occupational injuries.

**treatment variable:** ever unemployed; short ( $\leq 1$  year), mid (1-3 years], long ( $> 3$  years) unemployment

**outcome variable:** first hospital admission for IHD (ICD-IX codes: 410-414)

# description of the sample (at the baseline)

	Controls - Never Unemployed		Treatment 1 - Short Unemployment		Treatment 2 - Middle Unemployment		Treatment 3 - Long Unemployment	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Age	40.13	5.52	39.06	5.51	39.95	5.66	40.44	5.56
Entry weekly wage	339.34	134.37	309.15	104.23	312.30	94.21	322.71	98.22
Mean weekly wage	395.89	89.59	358.29	82.58	362.13	86.04	369.97	94.88
Weeks unemployed	7.49	20.60	19.79	31.65	23.74	34.24	30.82	39.38
Weeks subsidy	0.22	3.14	0.90	7.06	0.96	7.16	2.07	11.89
Weeks worked	597.08	45.27	571.32	60.54	567.56	60.90	562.59	63.87
Weeks sick absence	7.56	10.73	8.66	12.28	8.80	13.25	8.16	15.28
Professional diseases (0/1)	0.00	0.06	0.00	0.05	0.00	0.04	0.00	0.04
Severe injuries (0/1)	0.04	0.19	0.04	0.21	0.04	0.20	0.04	0.20
Firm size (0/1)								
0-9	0.20	0.40	0.34	0.48	0.30	0.46	0.26	0.44
10-19	0.11	0.32	0.13	0.34	0.11	0.31	0.09	0.29
20-199	0.34	0.47	0.35	0.48	0.35	0.48	0.29	0.45
200-999	0.16	0.37	0.11	0.32	0.11	0.32	0.15	0.35
>=1000	0.18	0.39	0.06	0.24	0.12	0.33	0.22	0.41
Sector of activity (0/1)								
Primary sector	0.01	0.10	0.02	0.12	0.02	0.13	0.01	0.11
Manufacturing	0.65	0.48	0.54	0.50	0.50	0.50	0.42	0.49
Construction	0.09	0.28	0.19	0.39	0.19	0.39	0.15	0.35
Commerce	0.09	0.28	0.11	0.31	0.10	0.30	0.09	0.29
Transport	0.09	0.29	0.07	0.25	0.09	0.29	0.07	0.26
Other service	0.07	0.25	0.08	0.28	0.10	0.30	0.25	0.44

# R1: it's long (cumulated) unemployment that hurts

- While short and medium unemployment do not have any negative effect on health, long unemployment does.

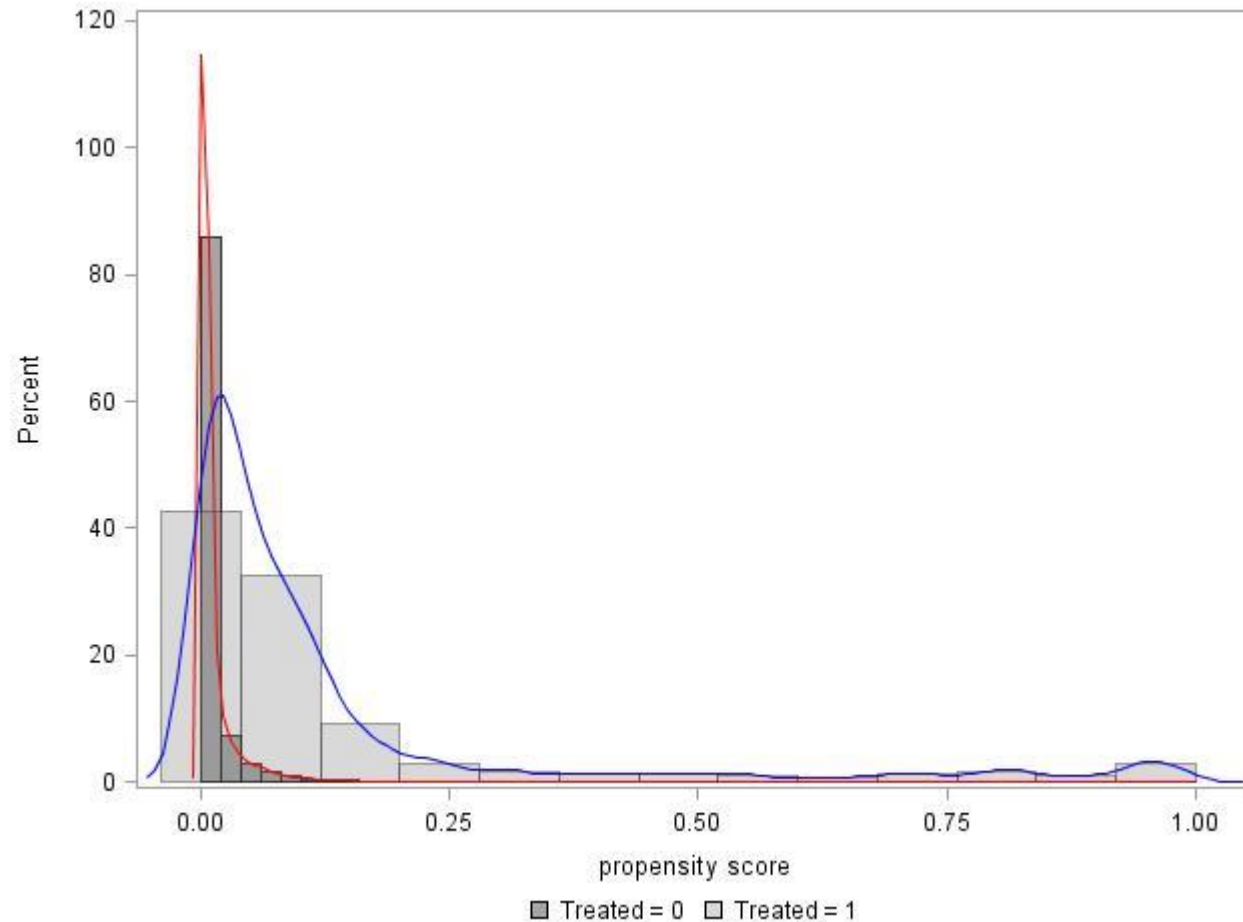
*Unemployed for more than 3 years have a risk of myocardial infarction 1.9 times bigger than workers with the same pre-treatment characteristics but continuously employed*

	ever unemployed	short unemployment	medium unemployment	long unemployment
Base Selection	1.096	0.931	0.907	1.912*

**short - to medium-unemployment seems protective!**

*Definition of unemployment: non job-spell with partial subsidy coverage. Legend: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$*

# R1: it's long (cumulated) unemployment that hurts



**Mean number of unemployment spells**

1.52

**% of treated with only one spell during the treatment**

65.18

**% of treated with up to two spells during the treatment**

89.49

# first heterogeneity analysis

With the original aim of controlling for the eventual residual confounding of bad health at the baseline, we posed other, increasingly stricter criteria to select the initial population

Base Selection	Selection 1	Selection 2	Selection 3
Male	Base Selection +  Employment intensity >90% in pre-treatment	Selection 1 +  Average sick-weeks <4 in pre-treatment	Selection 2 +  Average sick-weeks <3 in pre-treatment AND Max yearly sick-weeks < 10 in pre-treatment
30-55 years old in 2003			
Blue Collar			
No recall and seasonal job			
No work as self-employment			
At least 4 years of tenure			
Employment intensity > 75%			
No invalidity or disability			
No direct transitions from subs. unemployment to pension			
No heart attacks in 2001-2003			
Obs. 69.937	Obs. 63.568	Obs. 56.201	Obs. 45.857

# R2: the higher is the loss, the higher is the risk

- The more attached to the labour market and healthy is the population at the baseline, the higher are the risks associated to the exposure to unemployment

*Unemployed for more than 3 years have a relative risk of myocardial infarction rising from 1.9 to 2.8 times*

	ever unemployed	short unemployment	medium unemployment	long unemployment
<b>Base Selection</b> Employment intensity>75%	1.096	0.931	0.907	1.912*
<b>Selection 1</b> Employment intensity>90%	1.159	0.993	1.030	1.956**
<b>Selection 2</b> Employment intensity>90% Annual mean sick-weeks < 4	1.183	0.993	1.063	2.223***
<b>Selection 3</b> Employment intensity>90% Annual mean sick-weeks < 3 and max 10	1.275	0.940	0.864	2.787***

*Definition of unemployment: non job-spell with partial subsidy coverage. Legend: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$*

# R2: the higher is the loss, the higher is the risk

## → DISAPPOINTMENT PARADOX

When individuals with greater potential and expectations encounter economic adversity in adulthood, the experience is relatively unexpected (lower capacity to cope, lower accumulated resilience), resulting in higher levels of stress, depression and harmful health effects (Osika et al. 2008; Montgomery et al. 2013)

	RR	Att	Att Std	Factual	Counter-factual	n° T	n° C	n° matches	STD diff. %succes	Sianesi Test
Base Selection	1.912*	0.013	0.007	0.026	0.014	761	55,914	760	96%	Pass
Selection 1	1.956**	0.015	0.008	0.031	0.016	572	52,701	572	98%	Pass
Selection 2	2.223***	0.018	0.009	0.032	0.015	555	52,000	555	100%	Pass
Selection 3	2.787***	0.023	0.009	0.036	0.013	478	46,785	478	100%	Pass

*Definition of unemployment: non job-spell with partial subsidy coverage. Legend: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$*

# second heterogeneity analysis

- Unemployed who re-entered the LM as self-employed show an increased risk of CHD even at short durations of unemployment.
- Considering the binary treatment (ever unemployed or not), RR go from 1.70\* to 2.16\*\*\* along the “loss” gradient.
- Our Hypothesis: self-employment is an escape from unsustainable unemployment, as postulated by the “Push theory” (Raquel 1999 and Moore 2002)

	RR	ATT	ATT S.E.	Factual	Counter-factual	n° T	n° C	n° matches	STD diff. %successes	Sianesi Test
Base Selection	1.695*	0.007	0.004	0.016	0.009	1,492	55,914	1,492	100%	Pass
Selection 1	1.905**	0.009	0.004	0.018	0.010	1,093	52,701	1,093	100%	Pass
Selection 2	2.150**	0.010	0.004	0.019	0.009	1,068	52,000	1,068	100%	Pass
Selection 3	2.159**	0.011	0.005	0.020	0.009	945	46,785	945	100%	Pass

# second heterogeneity result

	unemployed not self-employed	unemployed and then self-employed	p-value
Age	40.17	37.37	***
Mean weekly wage	365.23	352.39	***
Weeks worked	568.08	559.33	***
Weeks unemployed	24.34	30.13	***
Weeks subsidy	3.19	1.55	***
Weeks sickness absence	8.51	8.40	
Total injuries	0.21	0.21	
Severe injuries	0.04	0.04	
Firm size (0/1)			
0-9	0.29	0.42	***
10-19	0.11	0.13	**
20-199	0.33	0.30	***
200-999	0.13	0.09	***
>=1000	0.14	0.07	***
Area of work (0/1)			
North	0.48	0.61	***
Centre	0.19	0.19	
South and Islands	0.34	0.20	***
N. Obs.	12,296	1,492	

# summing up

- Exploiting a very rich and long database on work and health histories, we were able to detect large and statistically significant effects of unemployment on myocardial infarction and other ischemic heart diseases.
- The result is to be found for those who cumulated more than three years, during a four years long follow-up window. With respect to those who remained employed their risk of CHD is twice as large.
- At shorter unemployment durations, a risk is detected among those who open a self-employment activity as a way out of unemployment.
- We find confirmation of a disappointment paradox: the larger and more unexpected is the loss of intangible assets linked to the job, the larger is the increase in the risks of CHD.